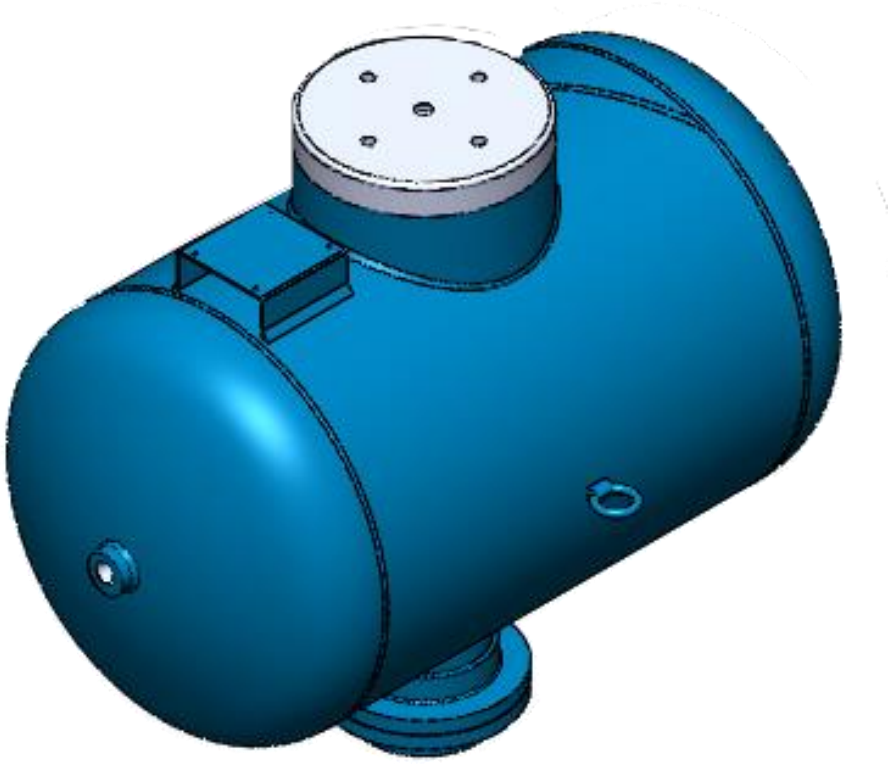
Installation and Maintenance Manual for MIDES® Air Blaster

MODELS 6TMM and 6AT



MIDES – REV. 2018

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1. INTRODUCTION

The MIDES® Air Blaster is a system to help resolve problems involving blockage caused by accumulation and aggregation of materials in silos, hoppers, chutes, pipes, combustion air pre-heaters, truck skips and other sites.

The MIDES® Air Blaster instantaneously (+/- 10 milliseconds) expels a compressed air load directed at critical areas where the material tends to accumulate. The released energy (E_c = 115 J) is enough to clear the passageway and dislodge the material from the walls without entailing any harmful effects on the installation, thereby providing a continuous discharge flow while removing material dead spots.

2. TECHNICAL DATA OF THE MIDES® AIR BLASTER

MODELS (6TMM/6AT)

MODELS	DMA	DMB	DMC	DMD	DME	DMF	DMG
Capacity	12 l	25 l	50 l	75 l	100 l	150 l	200 l
Weight	18 kg	25 kg	50.16 kg	56.19 kg	62.54 kg	75.23 kg	87.60 kg
Discharge pipe thread	2" BSP	2" BSP	4" BSP	4" BSP	4" BSP	4" BSP	4" BSP

Note: MIDES 12-litre (DMA) and 25-litre (DMB) Air Blasters come with a factory-installed MIDES® 6AT Valve. All other models come with the MIDES® 7AT Valve.

CONSTRUCTIVE FORM OF THE VESSEL	6TMM/ 6AT
Vessel Classification (NR-13)	CAT. "V" – CLASS "C" – GROUP 5
Regulatory and Constructive Standards	NR-13 / ANSI / ASME BPV VIII-1 (2010 edition).
Max./Min. temperature Outdoor environment	180 °C/-30 °C
Hydrostatic Test Pressure (HTP)	10.4 bar
Max. Allowable Working Pressure (MAWP)	8.0 bar
Recommended Working Pressure	Min.: 5.5 bar / Max.: 7.0 bar
Container refill time	Standard time 45 seconds at 6.0 bar
Residual pressure following discharge	< 0.5 bar
Stored air explosion time	< 0.10 sec
Compressed air quality	Clean industrial air
Paint	MIDES Standard – POP 07

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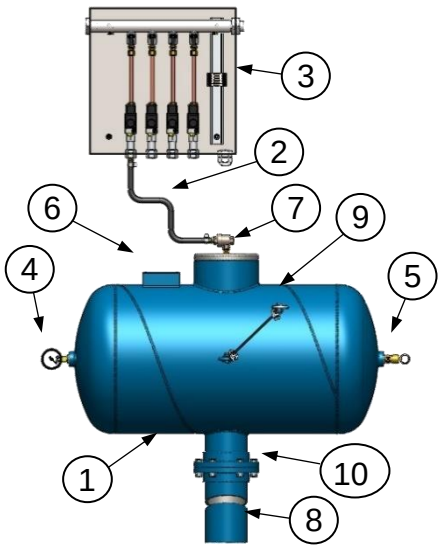
2.1 SUPPLY DIAGRAM



(1) – MIDES® Air Blaster (Vessel, 6TMM or 6AT Valve, Joint and Adhesives, all come mounted).

(2) – Rubber Hose Ø3/8” - (maximum L) = 8m. (Max.) per blaster.

(3) – Electro/Pneumatic Triggering Panel with 3/2 -way Valves and ready-mounted Long-Assembly Kits.

(4) – MIDES Pressure Gauge – 0 - 200 psi (0 to 10 bar).

(5) – MIDES® Safety Valve.

(6) – Identification and registration plate.

(7) – MIDES® 3/8” Quick Exhaust Valve.

(8) – Discharge Pipe and Diffusers.

(9) – Pre-mounted Suspension and Safety Cable.

(10) – 4” Threaded Joint (joining the vessel to the pipe).

NOTES:

- 3/2-way valves for controlling and triggering MIDES® Air Blasters, normally open “NA”, ¼” NPT threads, 110 or 220 Vca - 60 / 50 Hz solenoid drive (Possibly 24 Vca or 48 Vca) and spring return. Minimum flow coefficient of 1000 litres/minute.

- Compressed air feeder pipes leading to blasters with the 6AT system: Rubber hoses or metal pipes, Ø3/8" x 10,000 mm (maximum) and compressed air feed connections from the pneumatic control to the MIDES® pieces of equipment.

REM: The standard MIDES® supply consists of rubber hoses with a nylon mesh and 3/8” diameter. Pipes and hoses of different diameters may not be used together.

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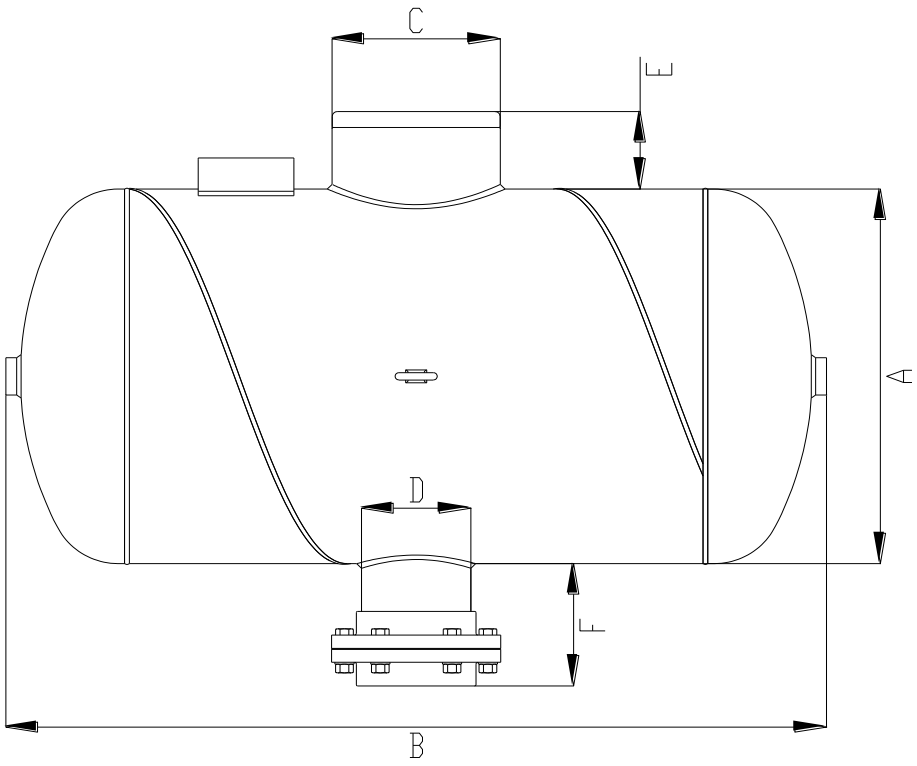
2.2 DIMENSIONS



DIMENSÕES GERAIS MODELOS 6TMM / 6AT											
MODELO:	CAPACIDADE (lts):	PESO (kg):	PMTA (bar):	MDMT (°C):	PTP (bar):	A (mm):	B (mm):	C (mm):	D (mm):	E (mm):	F (mm):
DMA:	12	30,8	8	-8	10	273	409,2	176	60,3	73,7	128,9
DMB:	25	35,06	8	-8	10	273	609,2	176	60,3	73,7	128,9
DMC:	50	43,31	8	-8	10	273	899,2	176	114,3	73,7	134,4
DMD:	75	50,7	8	-8	10	406,4	737,3	176	114,3	84	132,7
DME:	100	54,5	8	-8	10	406,4	857,3	176	114,3	84	132,7
DMF:	150	67,2	8	-8	10	406,4	1257,3	176	114,3	84	132,7
DMG:	200	76,7	8	-8	10	406,4	1557,3	176	114,3	84	132,7
CÓDIGO DE PROJETO:		ASME BPVC Sec. VIII Div. 1, Sec. II Part D, Sec. IX, Ed. 2010 2011a Addenda									
CLASSE:	C	CATEGORIA:		V	NR-13						
GRUPO:	5										

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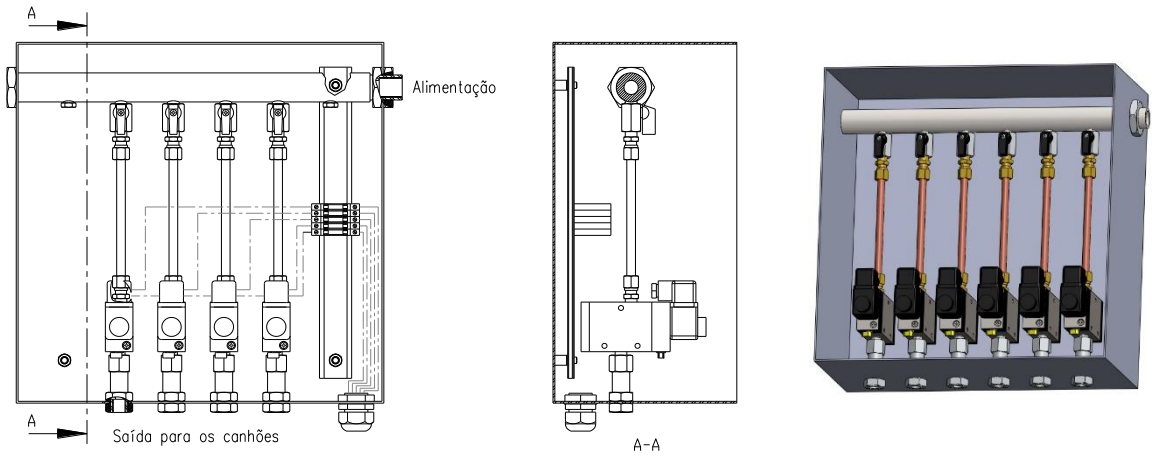
2.3 PNEUMATIC CONTROL PANEL



Every pneumatic control valve, electrical control wiring and the main air infeed pipes will be mounted at a site located far from and protected against points comprising aggressive agents. The pneumatic control panels and the air blasters will be interconnected using hoses and/or rigid pipes.

This panel is recommended anywhere, especially where the environment comprises agents that are aggressive to MIDES® Air Blaster control panel. This panel's capacity enables 06 3/2-way valves.

Note: The pipes can interconnect the Electro/Pneumatic panel to the MIDES® Air Blaster using rigid pipes (normally galvanised or copper pipes), while keeping to the maximum recommended distance (10 metres) and the maximum recommended diameter (Ø3/8”). In this case, the customer shall be responsible for providing the proper supply.

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2.3.1. TECHNICAL FEATURES

⇨ **Panel:**

RR010 panel box, 400x400x200, 50-micron polyester/epoxy finish, RAL 7032, insulation class IP65, equipped with:

- Compressed air distributor for mounting 1 to 6 3/2-way “NA” pneumatic control valves (110 or 220 Vca or 24 Vcc).
- Individual ball valve per Ø¼” valve.

⇨ **Control valves:**

3/2-way, ¼” NPT control valve, normally open, solenoid drive of 24/48/110/220 Vca at 50 or 60 Hz and spring return, equipped with:

- Control hoses or pipes, interconnecting the panel to the pieces of equipment.
- Valve with a manual actuator for individual testing.
- Reel protection with IP65 connector
- Control voltage: 110 or 220 Vca – 50 to 60 Hz – Special 48 or 24 Vcc.

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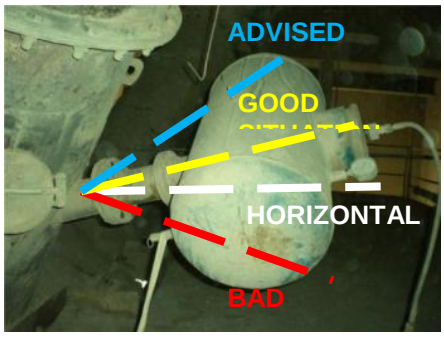
3. INSTALLATION

The installation project show every mounting detail regarding the blasters and accessories, where the following points shall be observed.

3.1 DISCHARGE PIPE

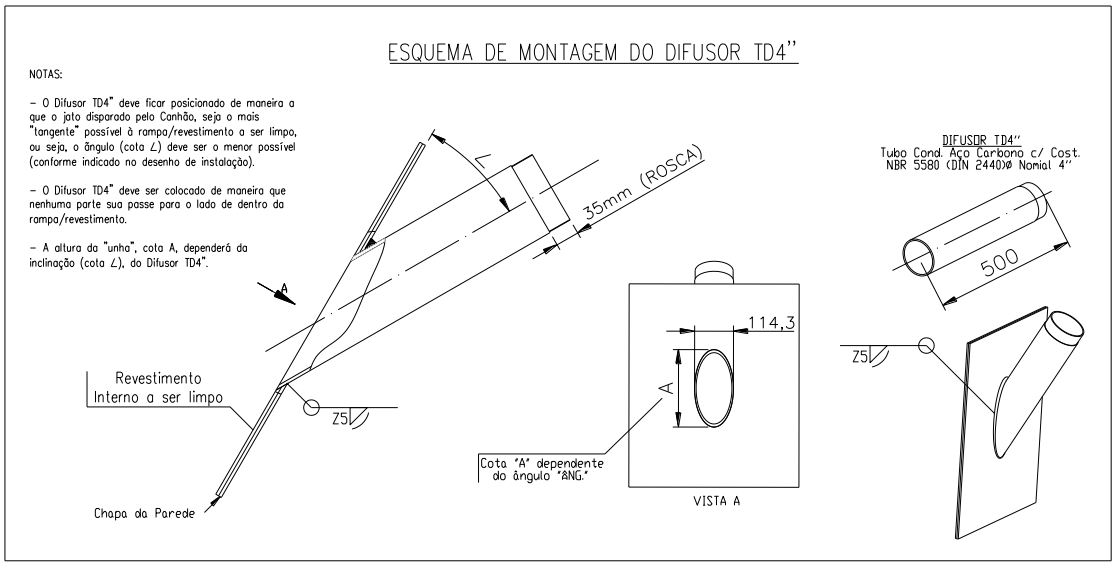
The discharge pipe shall be as short as possible (maximum 500 mm, as provided with the MIDES® Air Blaster) and **stick to the direction and angle mentioned in the project**. Always positive or null slope, NEVER installing with a negative slope.



3.2 MIDES® NOZZLE

In the case of diffusers, these need to be at the height shown in the project, with its direction tangent to the wall to be cleaned. The diffusers shall be installed as per the instruction below:

3.2.1 MIDES® TD4" NOZZLE



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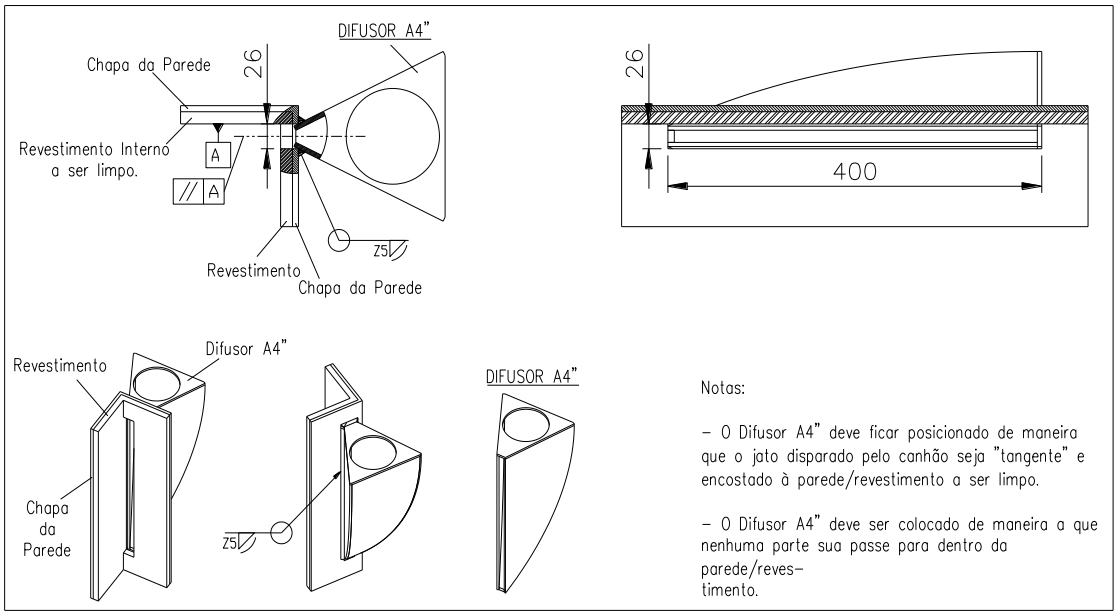
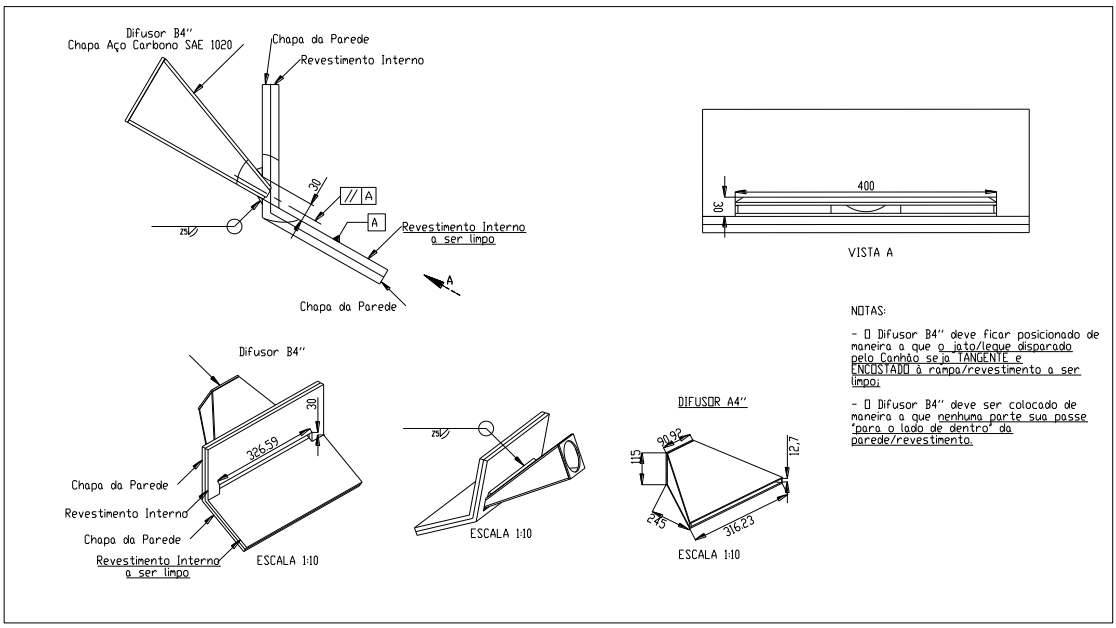
3.2.2 MIDES® A4” NOZZLE



3.2.3 MIDES® B4” NOZZLE



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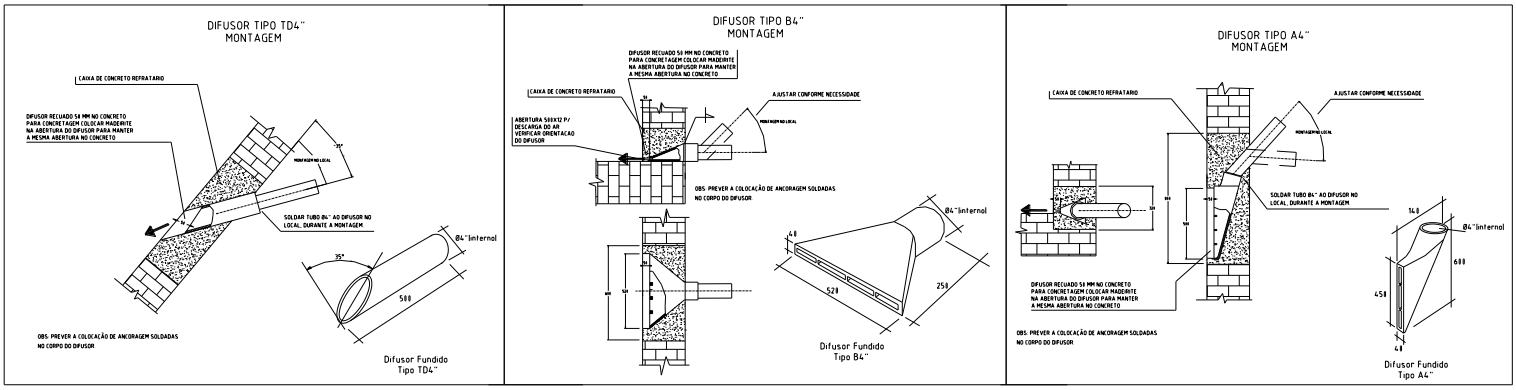
3.2.4 SPECIAL NOZZLE

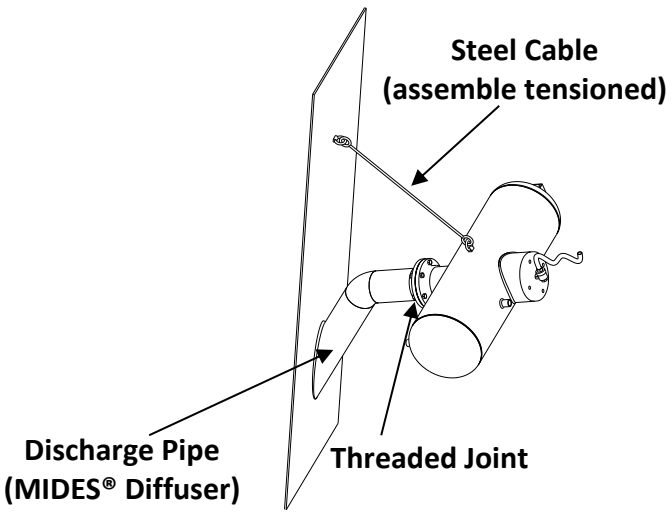
Special diffusers are made of cast stainless steel (DIN 2520), used for sites with high temperatures; these shall be installed and embedded in refractories and as outlined in the project.

See some simplified examples below:



3.3 SAFETY CABLE

The MIDES® Air Blaster shall be fastened only by joining it with the discharge pipe and the duly tensioned steel cable. Use a tightener on the steel cable to facilitate maintenance and adjusting its tension. NEVER FASTEN RIGIDLY.



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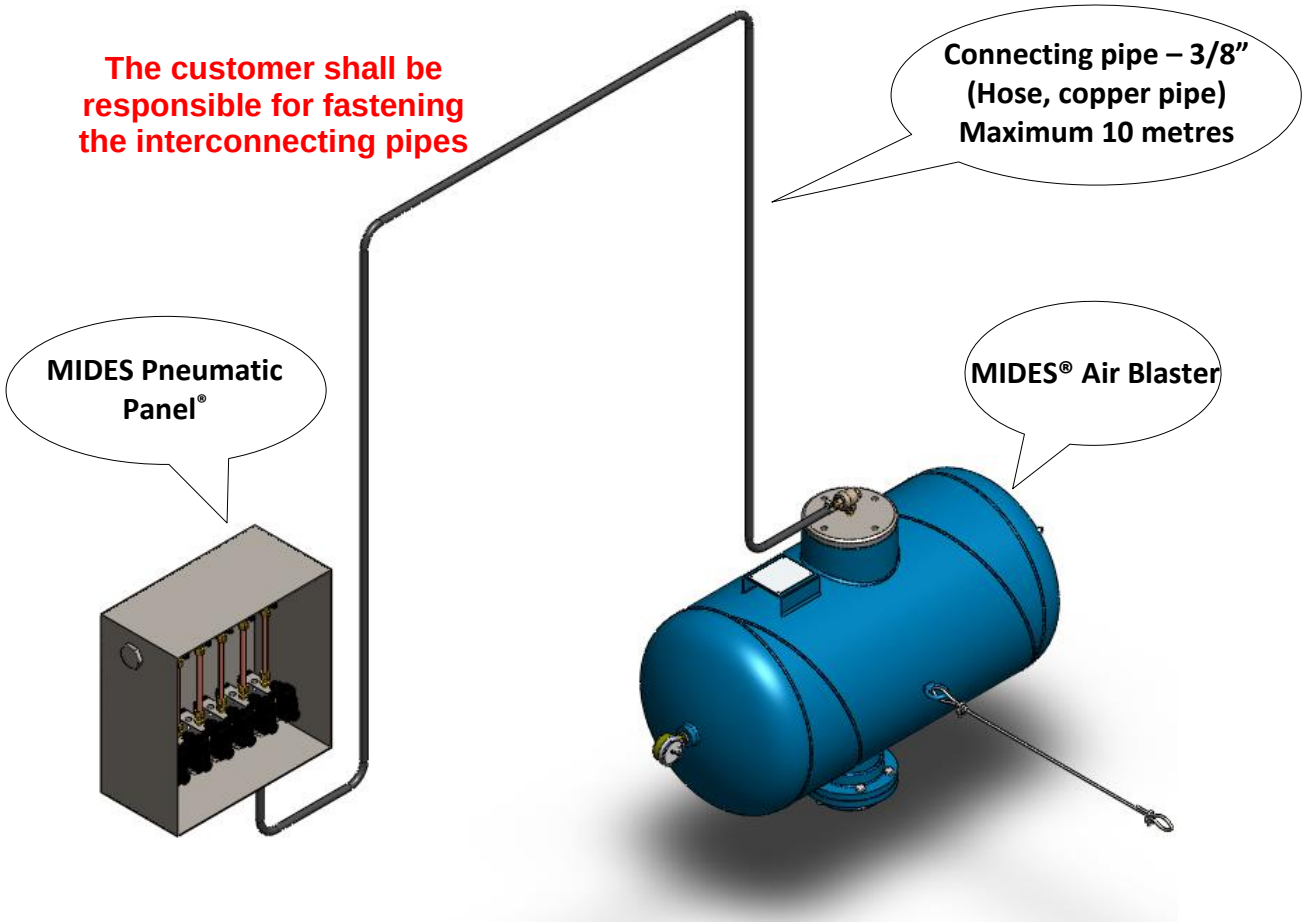
Note: The MIDES® Air Blaster fastened with clamps or using a type of fastener other than the one given can entail irreparable damage to the equipment.

- In those points where the blasters are installed, make sure the compressed air installations keep to the pressures shown in the project.

- Compressed air shall be fed into the MIDES® Air Blaster using flexible or rigid pipes.

See below for details on how to interconnect the equipment:



Note: Compressed air shall be clean, that is, free of impurities such as oil, water and particles. The pressure of compressed air shall keep to the minimum pressure shown in the project, and the working range shall be 5.0 to 7.0 bar (ideally, 7.0 bar).

- At installations in areas with high temperatures, keep a distance of no less than 300 mm from the hot surface near the equipment, along with the compressed air and actuating (control) pipes.

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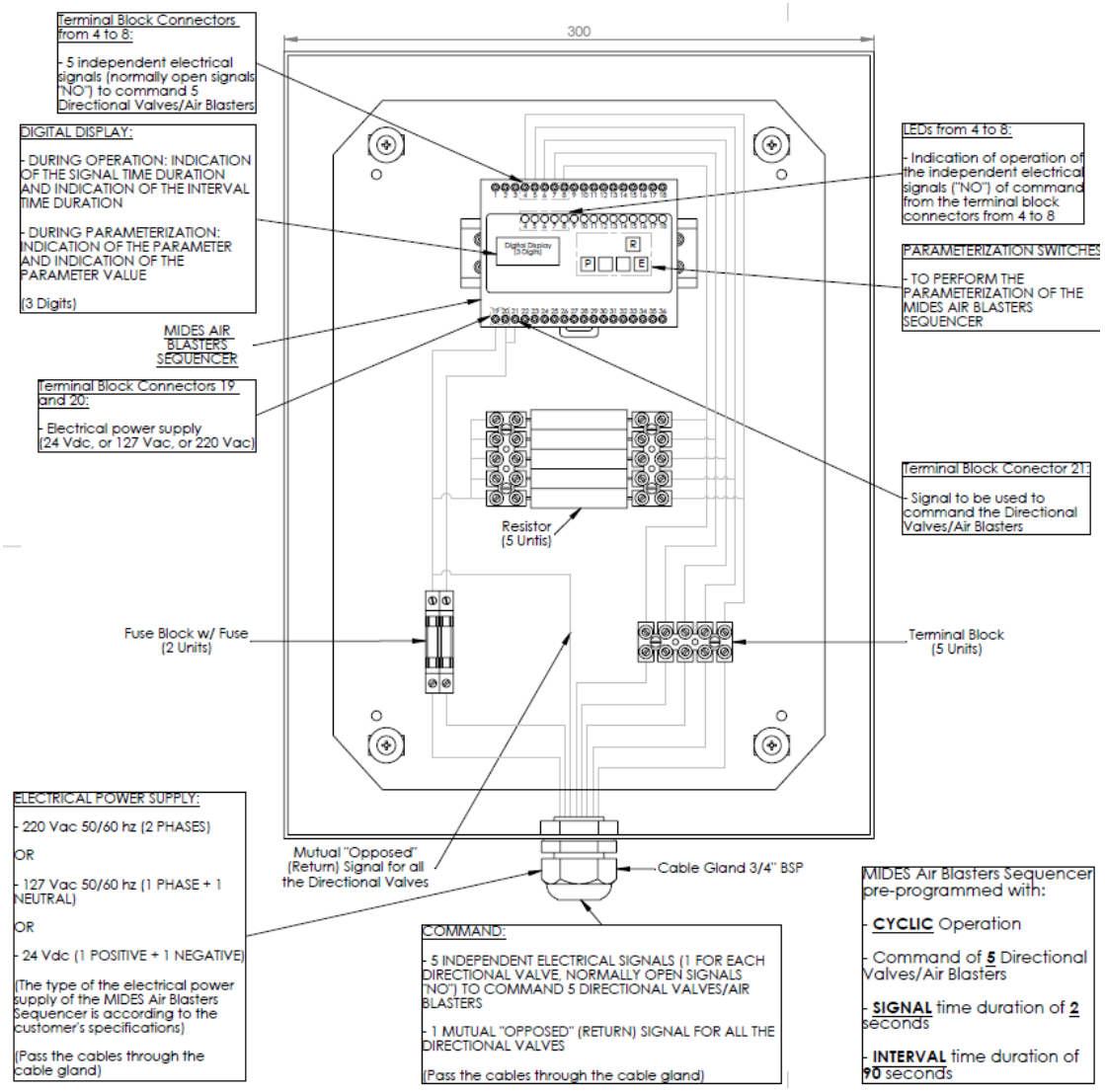
4. ELECTRICAL CONTROLS – MIDES® PLC

The blasters' electrical control (directional valve actuation control) comprises a MIDES® Cyclical Timing Trigger Device (MIDES® PLC). Manual and wiring diagram for this device are provided separately.

Note: To electrically activate the equipment and adjust the operating logic, MIDES® recommends using the customer's PLC. If the customer does not have a PLC, the MIDES® sequencing device shall be considered.



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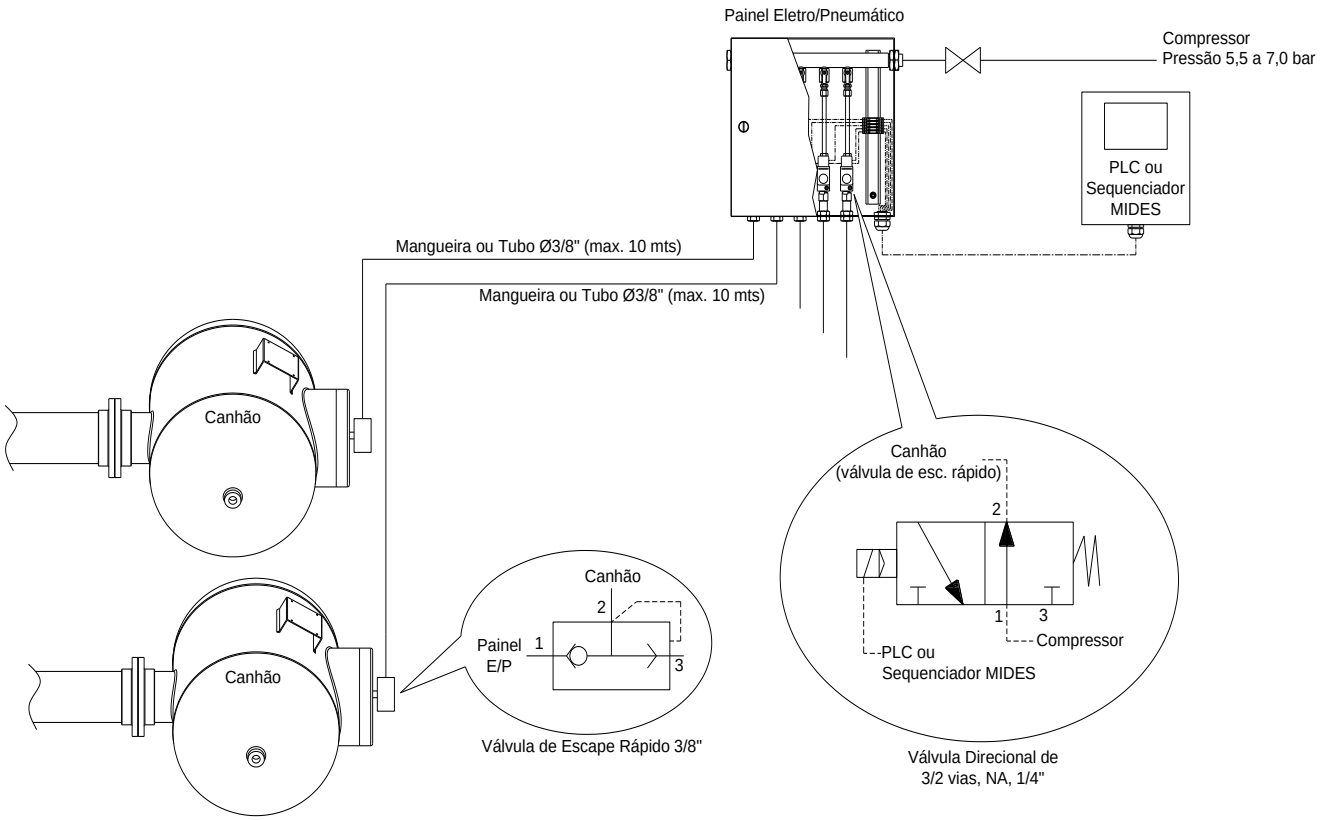
4.1 MIDES® PLC TECHNICAL SPECIFICATION

Specification:	Value:	Note:
Voltage	24 Vdc 127 Vac 50/60 hz 220 Vac 50/60 hz	To be notified by the customer
Pulse time	1 to 99.9 seconds 1 to 99.9 minutes 1 to 99.9 hours	Pre-programmed by MIDES with 2 seconds, this can be programmed in situ, as needed
Time Span	1 to 99.9 seconds 1 to 99.9 minutes 1 to 99.9 hours	Pre-programmed by MIDES with 90 seconds, this can be programmed in situ, as needed
No. of MIDES® Air Blasters	1 - 15 MIDES® Air Blasters	Pre-programmed as the customer requires

5. GENERAL CONNECTION FLOWCHART



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6. OPERATION

MIDES® Air Blasters can be operated either in preventive or corrective mode:

=> PREVENTIVE: The operation's ideal and recommended condition, with automatic control built into the operating system. This enables making sure the blasters operate at the right moment, without the need for human intervention.

=> CORRECTIVE: Normally with manual or semi-automatic control, where the operator shall activate the equipment whenever necessary. Normally used in situations where blockages occur occasionally and the possibility of using automatic activation is nil.

Note: It's important to bear in mind that, for both operating situations given above, the equipment shall go off at least once a day, and shall also remain pressurised. Depressurise them only in the event of maintenance or intervention where they operate.

The following points must be observed regarding the system's operation and safety:
- At installations where the air blasters are in place, make sure the compressed air is connected and within the pressures shown in the project. When the equipment is depressurised, it can entail the return of material and gases back into the vessel via the discharge pipe.

Always keep the air blasters pressurised, and depressurise them only in the event of maintenance or intervention where they operate.

- The air blasters must not be triggered (activated) when the site where they are installed is not in operation. In the case of silos and hoppers, make sure the material extraction system is in operation and the discharge site is open; otherwise, the blaster's trigger could entail the material's compacting close to the discharge outlet. **Intersperse the air blasters' trigger system with the material's discharge system.**

- CAUTION: **Turn off the compressed air and depressurise the air blasters before starting any maintenance work**.
Other technical and safety information is provided together with the installation project, such as the use of compressed air, working pressure, trigger cycles, trigger intervals, triggering sequence and suggestions provided on safety signalling plates.

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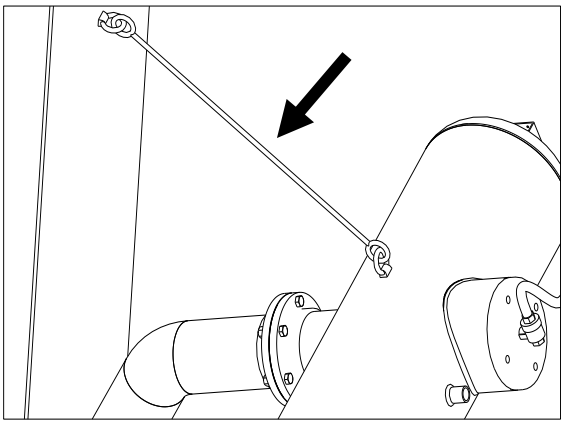
7. MAINTENANCE

For more details regarding the parts given below, see enclosed (annex 1), in drawing 09.450.000.010, the general list of parts of model 6AT.

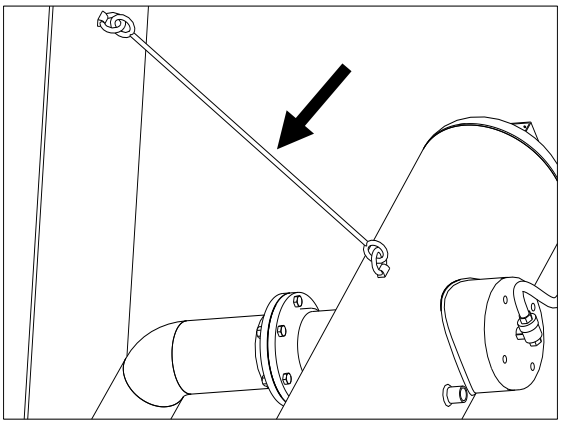
Note: If necessary, replace the MIDES® 6TMM Valve (Pos.44) with the MIDES® 6AT Valve (also Pos.44). The quick exhaust valve (Pos.56) shall be provided as required by the customer, as 1/4" or 3/8” (if the main valve is still 6TMM) or 3/8” (if the main valve is now 6AT).

7.1 CHECKING THE ASSEMBLY

- Suspension cable (Pos.30): Check cable tension



- Threaded Joint (Pos. 35): Check whether the protective seal has been removed and whether the screws are properly tightened.



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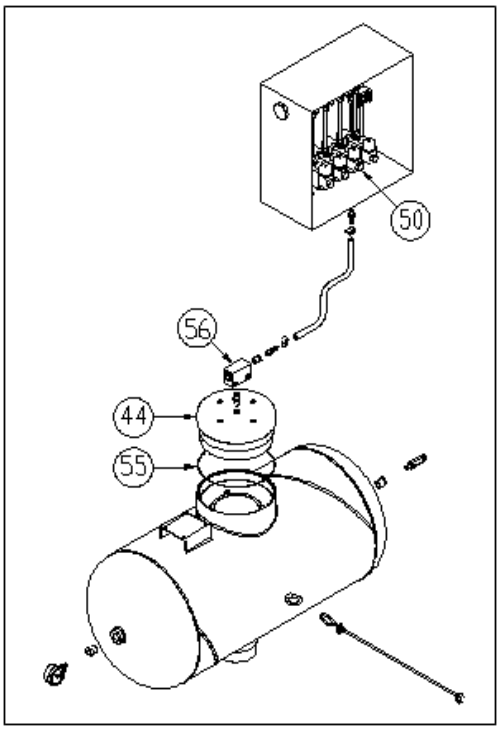
7.2. CHECKING THE MIDES® AIR BLASTER

This equipment does not require preventive maintenance, and, if necessary, switch positions 44(*) (6TMM and 6AT valve), 56 (3/8” quick exhaust valve) and 50 (3/2-way directional valve).



(*) – The 6TMM and 6AT valve is fully encased, and its useful life exceeds 3 years. This valve comes with a full 3-year warranty and if there is an issue during this period, MIDES® shall replace it at no extra charge, provided the issue is workmanship- or material-related, as defects caused by equipment misuse are not covered under this warranty. You are advised to replace it before its 4th full year of use.

REM: When replacing or disassembling the 6TMM and 6AT valve, it shall be re-assembled/checked as per the procedure found under item 9 of this manual.

In the event of leakage, check the parts identified under positions 44, 55 as well as every connection in the vessel (see drawing above). The part under position 44 shall be re-tightened as needed, while the part under position 55 shall be replaced, if necessary.

REM: This equipment does not require lubrication. You are advised to completely remove water, oil and particles from the air line.

Pieces of equipment with valves model 6TMM and 6AT come with a 3-year warranty, and this valve is fully encased. None of its internal elements are replaced.

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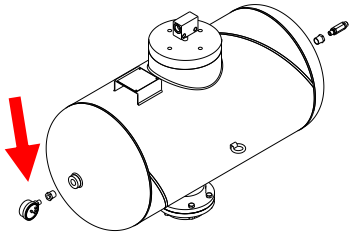
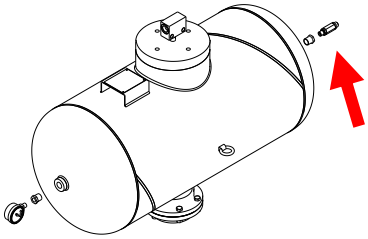
7.3. PARTS AND CONNECTIONS

Every blaster model comes with parts and connections that must be observed, most notably the following:

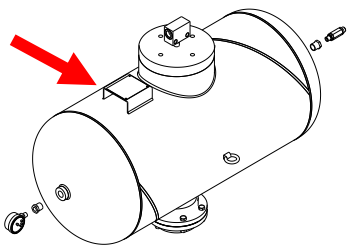
- **Pressure Gauge** – pos.31: Check overall status and calibration.



- **Safety Valve** – pos. 23: Check overall status and calibration (opening from 7.5 to 8.0 bar).



- **Identification Plate** – pos. 27: Keep this plate protected; if possible, identify the vessel with another kind of material, in order to preserve its serial number (xxxx/yyy or xxxx/yyyy).



REM: The serial number is the vessel's identity, preserving this plate and its serial number ensures its identification and the issuance of a duplicate inspection report, as needed.

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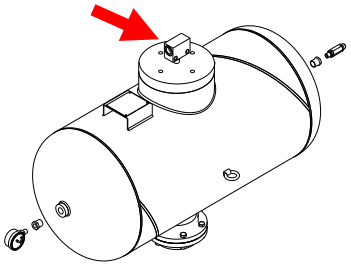
- **Quick Exhaust Valve MIDES** – pos. 56: Check filter and working order.



3/8” valve
For blasters with a 6AT valve
(Valve w/ exhaust filter)

For blasters with
a 6TMM valve

- **Adhesive with safety instructions – pos. 28**: Contain important information regarding equipment safety. If disabled, MIDES will need to provide a new adhesive to replace the damaged one. For more details concerning this adhesive, see item 8 of this manual.

- **Adhesive containing manufacturer identification – pos. 29:** Contains data on the manufacturer, such as address and contacts. If disabled, MIDES will need to provide a new adhesive to replace the damaged one.

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REM: THE COMPRESSED AIR LINE SHALL BE COMPLETELY FREE OF ANY OIL, WATER AND PARTICLES. ALWAYS KEEP THE EQUIPMENT PRESSURISED, TO BE DEPRESSURISED ONLY IN THE EVENT OF MAINTENANCE OR INTERVENTION WHERE SAID EQUIPMENT OPERATES. THE EQUIPMENT SHALL GO OFF AT LEAST ONCE A DAY.

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8. GENERAL USE AND SAFETY INSTRUCTIONS

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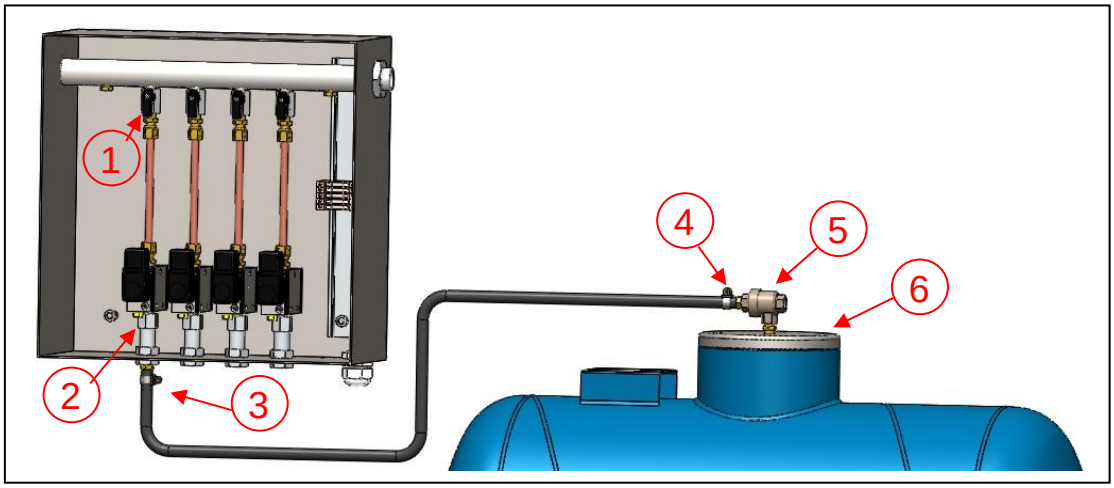
9. CHECKING PROCEDURE – 6TMM and 6AT VALVE.

If necessary, the goal of this procedure is to check, diagnose and maintain the 6TMM and 6AT valve.

9.1 - Identifying faults

The other parts that make up the system shall be checked. See below for details on how to identify faults:



1. With the equipment still under pressure, close the equipment infeed via the inlet valve (figure 1).

2. Manually activate the 3/2-way directional valve (figure 2 – look for the yellow part). Repeat the same test by activating the reel (electrical activation).

=> If the equipment triggers normally, it works problem-free.

=> If the equipment does not trigger, move on to the next step.

3. Also with the equipment still under pressure and the inlet valve closed (figure 1), loosen the connecting clamp from the hose to the pneumatic panel (figure 3). Firmly hold the hose so that it does not come loose. After loosening the clamp, quickly pull out the hose, by removing it from the connection point. This procedure will cause the equipment to go off.

=> If the equipment triggers normally, the fault lies with the 3/2-way directional valve.

=> If the equipment does not trigger, move on to the next step.

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4. Also with the equipment still under pressure and the inlet valve closed (figure 1), loosen the connected clamp from the quick exhaust valve (figure 4) and repeat the same procedure as the previous step.

=> If the equipment triggers normally, the fault lies with the directional valve, as it is unable to bleed the air found in the hose, or the hose contains flow problems.

=> If the equipment does not trigger, move on to the next step.

5. Remove the quick exhaust valve (figure 5) and connect the hose directly to the blaster (in the 6TMM or 6AT valve). Re-pressurise the equipment and close the inlet valve (figure 1). Repeat the clamp-loosening procedure under step 4.

=> If the equipment triggers normally, the fault lies with the quick exhaust valve.

=> If the equipment does not trigger, move on to the next step.

6. Depressurise the equipment and proceed as explained below, under item 9.2.

Note: These procedures under 9.1 are valid only if the equipment is stopped and pressurised. If the equipment is not under pressure, evaluate every valve (3/2-way directional valve – figure 2 and quick exhaust valve – figure 5) to make sure there is a passage for compressed air. If this happens, start off by checking the 6AT valve from item 9.2.

9.2 Checking the 6TMM or 6AT Valve

	
Using the appropriate tool (provided by MIDES), remove the 6TMM or 6AT valve.	Remove the 6TMM or 6AT valve, and be careful not to drop it.
Note: Since the valve is chemically sealed, it may be necessary to break that seal; to that end, if necessary, use an extension on the tool to increase the moment of force, to remove the valve. **Avoid striking the valve.**	**Note**: Dropping this valve can cause irreparable damage

After removing the valve, take it to a workbench and proceed according to the instructions below:

Note: Do not perform any cleaning operation on the part before proceeding as shown below.

- As shown in the sequence below (from left to right), use your fingers to press the “Main Piston” and the “Secondary Piston” of the 6TMM or 6AT valve. Repeat this procedure several times.

- When moving the components of this valve, as shown in the sequence above, proceed according to the following instructions.

=> After moving the “main piston” and the “secondary piston,” if no sign of gripping is felt/found in those parts, the valve is in perfect working condition; therefore, this valve can be cleaned and reinstalled. Perform the cleaning operation as shown below.

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Perform the cleaning operation on the valve and the seat (in the vessel), only between the lines given

Note: Clean only with a damp cloth. **Never use abrasive material or sandpaper when cleaning.**

If, after moving the “main piston,” a sign of gripping is felt/found, this indicates that there is foreign matter inside; therefore, proceed as shown below.

Wash the valve in running water, as shown in the images opposite.

Note: Move the “main piston” upward, to get water moving inside the valve.

If necessary, use a small amount of liquid soap.

Note: Move the “main piston” upward, to get water moving inside the valve.

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Perform the washing procedure, also by inserting water through the upper hole.

Note: Move the "main piston" upward, to get water moving inside the valve.

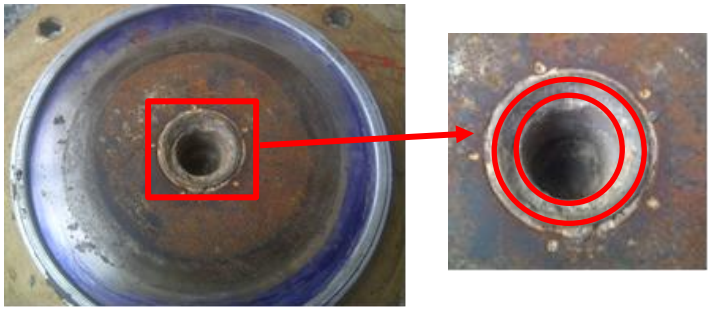
After washing and rinsing the valve, blow compressed air into it.

Note: Blow below, as shown.

REM: **NEVER CONNECT COMPRESSED AIR IN THE UPPER HOLE AND PRESSURISE THE VALVE WHILE IT IS DISASSEMBLED.**

- After conducting the inspections given above, re-assemble the valve in the vessel and test its efficiency (filling and triggering).

Even after performing every check, if the 6TMM or 6AT valve still shows operating problems, check for any excess material accumulated in the middle hole of the "Main Piston," as shown in the photo below.



The images opposite show the middle hole of the "main piston" in the 6TMM or 6AT valve, with considerable accumulation of material.

In the detail, it is possible to see the thickness of accumulated material between the lines.

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Note: Check the reason for the material backflow in this part. There are likely vessel positioning problems, the installation's inclination – see page 8, item 3.1.

If material is found as shown, the part shall be carefully cleaned without touching the “secondary piston.” Clean using a screwdriver or any other similar tool. Washing and/or blowing on the part to remove material after cleaning.

=> After installing the valve, if the blaster does not fill up, contact MIDES immediately to assess and replace the valve, if necessary.

=> If the blaster does not trigger after pressurising, contact MIDES immediately to assess and replace the valve, if necessary.

Notes:

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1. If the 6TMM or 6AT valve is shown to be defective and no longer under warranty, they shall be replaced. Just a reminder **that the valve comes with a 3-year warranty** and warranty data are engraved – see image. For any questions, contact MIDES immediately.

- Serial Number
e.g.: V256

If the valve does not come with the data shown in the photo opposite, forward the blaster's serial number, which appears on the identification plate, to MIDES– see page 18 , POS.27

2. Defects caused by equipment misuse are not covered by the warranty.
3. Valves with working problems, due to a malfunction of any internal element, shall be replaced following a technical assessment, via a technical visit or photos sent to a MIDES staff member in charge.

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10. GENERAL INFORMATION

10.1 Checking the MIDES Air Blaster's Working

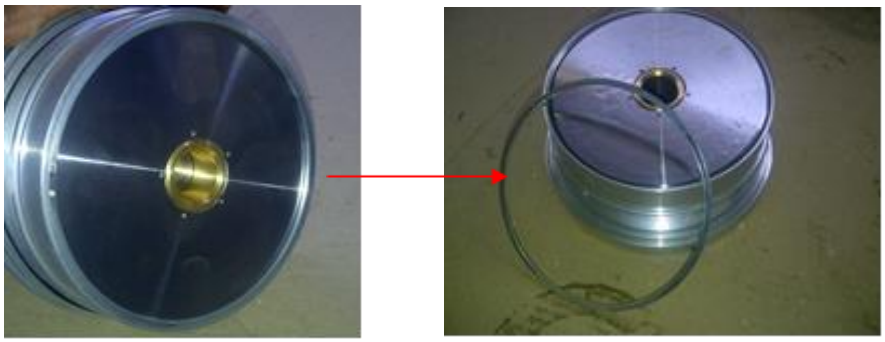
The blaster's working and its efficiency are identified only from the behaviour of the vessel's pressure gauge.

Verification of efficiency in the blaster's trigger is measured by the vessel's instantaneous emptying; that is, the value of the pressure measured on the pressure gauge shall instantaneously drop to zero or too close to zero after the trigger. Any observation differing from this means that there is a working deficiency. ***The pressure gauge shall always be in proper working condition.***

Note: The 6TMM and 6AT blaster have a very low noise level compared to other pieces of equipment. The noise caused by said equipment must not be used as an efficiency and working parameter.

10.2 6TMM and 6AT Valve Seal

Never remove the 6AT valve locking seal; otherwise, this will void the warranty.



Note: A broken locking seal shall be immediately reported to MIDES.

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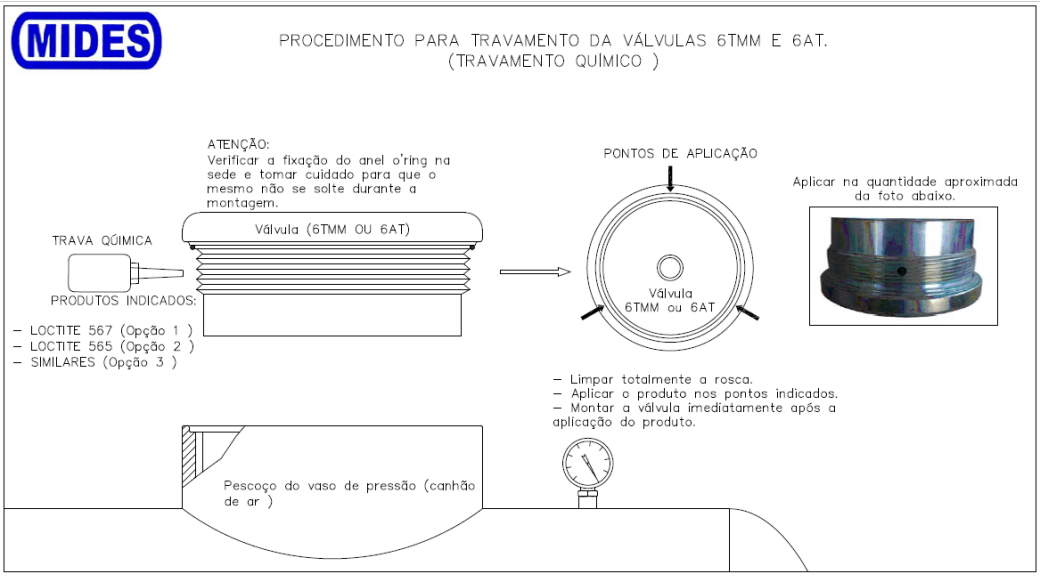
10.3 6TMM or 6AT Valve ChemicaL Adhesive

Use an Chemical adhesive when assembling the 6TMM or 6AT valve, as shown below.



Note: Not using the adhesive could entail loosening the valve and, as a result, working problems such as emptying of the Air Blaster and breaking the 6TMM or 6AT Valve seal.

10.4 Loosening the 6TMM or 6AT Valve

Check for loosening issues in the installation of the 6TMM or 6AT valves. If this issue occurs, locks the valves as per the preceding item.

Just a reminder that said loosening <u>does not entail a safety risk</u>, but only a risk to the equipment's proper working.

The adhesive procedure shall be applied as directed under item 10.3

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10.5 Triggering the MIDES Air Blaster model 6TMM or 6AT

Always keep the equipment under pressure, and depressurise them only in the event of maintenance or intervention where they operate. You are advised to have the equipment go off at least once a day

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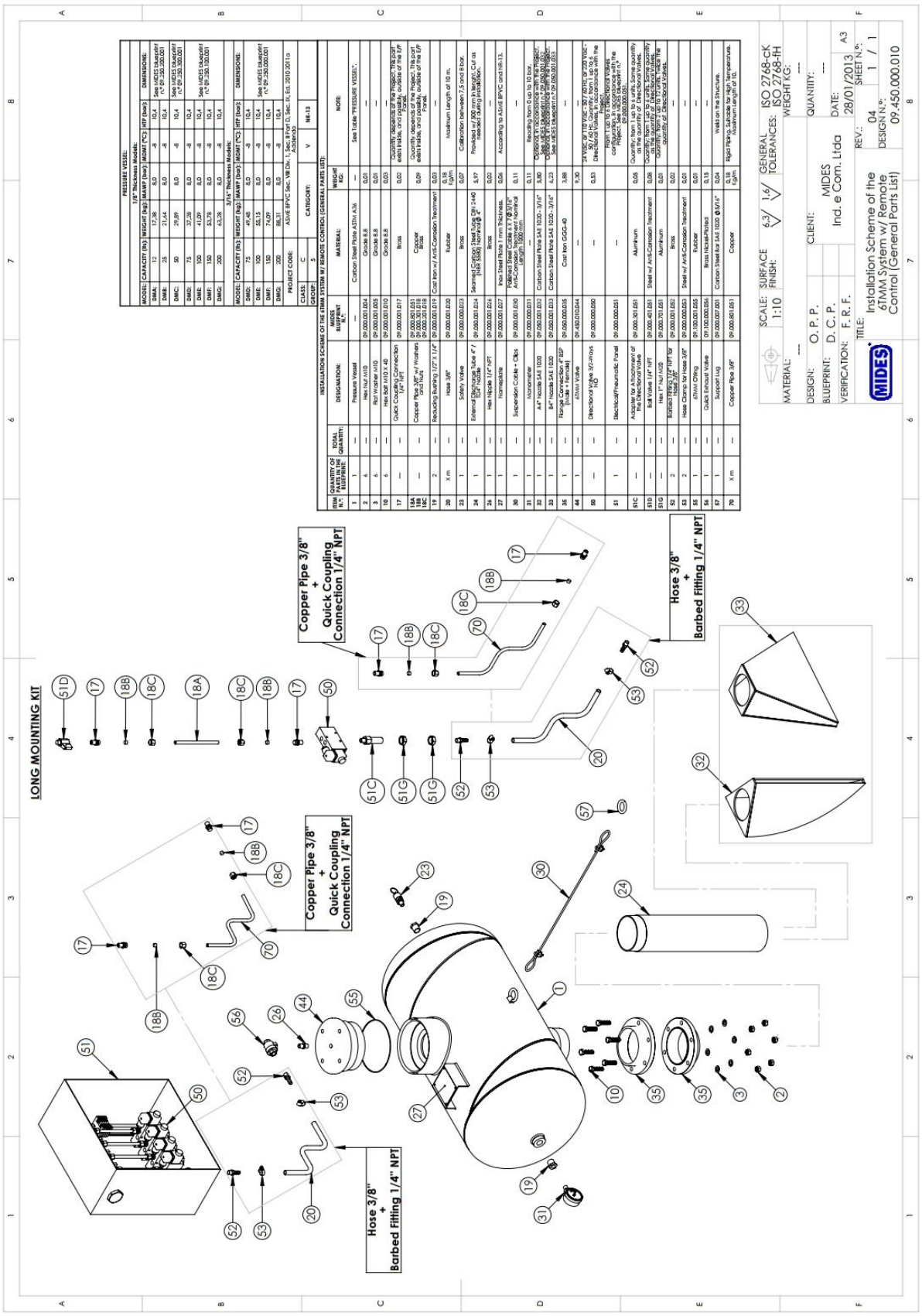
ANNEX 1 – GENERAL PARTS LIST



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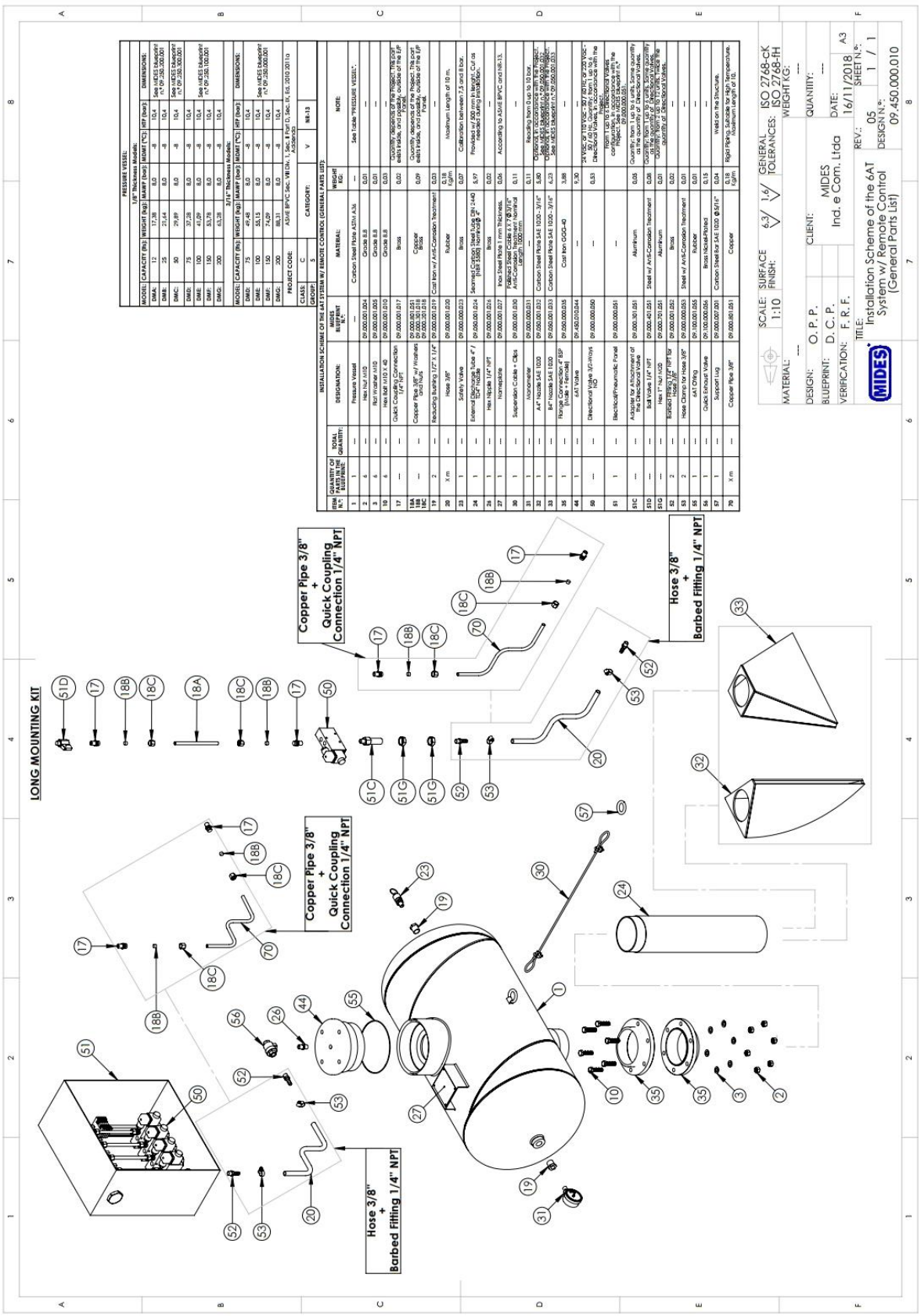

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